European Network of
Transmission System Operators
for Electricity

entsoe

Explanatory document to Energinet and Svenska kraftnät amended proposal in accordance with Article 33(1) of the Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing

3 February 2025

Contents

ENTSO-E AISBL • Avenue de Cortenbergh 100 • 1000 Brussels • Belgium • Tel + 32 2 741 09 50 • Fax + 32 2 741 09 51 • info@entsoe.eu • www.entsoe.eu

Introduction

This document provides background information as well as the motivation for Energinet and Svenska kraftnät amended proposal for the establishment of common and harmonized rules and processes for the exchange and procurement of FCR balancing capacity in accordance with Article 33(1) of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereinafter referred to as "the EB Regulation"). This proposal is hereinafter referred to as "the Proposal", and Energinet and Svenska kraftnät are hereinafter collectively referred to as "the TSOs".

Purpose

The purpose of the exchange of FCR balancing capacity is to ensure operational security for the control area of Sweden and bidding zone of eastern Denmark (DK2). The common FCR balancing capacity market adds operational security of supply, however also market function efficiency is expected to increase compared to separate domestic market setups.

Background

The TSOs have developed an amended proposal for a common market for the procurement of FCR balancing capacity. The common balancing capacity market is based on the Nordic FCR dimensioning process, which determines the FCR balancing capacity volume obligation for the Nordic synchronous area. A common market allows for the demand obligation of the TSOs to be partly procured outside the TSO's control area, if the offers available are more cost effective than the offers available to the connecting TSO. The overall amount of procured balancing capacity should generally not change, only its geographical distribution.

The TSOs currently use two types of Frequency Containment Reserves (FCR): FCR for normal operation (FCR-N) and FCR for disturbance situations (FCR-D). In addition to procuring FCR-D for upward regulation, the TSOs are also procuring FCR-D for downward regulation as of January 2022[1] using the same market setup as the already existing FCR balancing capacity products. The Proposal therefore includes three FCR-products: FCR-N, FCR-D upwards and FCR-D downwards.

Legal basis

Regional capacity markets are not mandatory under European legislation, but regulated. Article 33(1) of the EB Regulation establishes that TSOs exchanging […] balancing capacity shall develop a proposal for the establishment of common and harmonised rules and processes for the exchange and procurement of balancing capacity. Since the TSOs are exchanging FCR balancing capacity, a draft proposal was developed and a public consultation of the draft proposal was conducted as required by article 10 of the EB Regulation. The TSOs have assessed the views of stakeholders resulting from the consultation, and have prepared a consultation report.

[1] Svenska kraftnät started procuring FCR-D for downward regulation in January 2022. Energinet started procuring FCR-D for downwards regulation in September 2022.

ENTSO-E AISBL • Avenue de Cortenbergh 100 • 1000 Brussels • Belgium • Tel + 32 2 741 09 50 • Fax + 32 2 741 09 51 • info@entsoe.eu • www.entsoe.eu

The proposal

Application of the TSO-TSO model

The TSOs will exchange FCR balancing capacity based on a TSO-TSO model. This implies that each Balancing Service Provider (hereinafter "BSP") provides balancing capacity to its connecting TSO which also has prequalified the BSP. There shall only be contractual arrangements between the TSOs and between BSPs and their connecting TSO.

The TSOs shall strive to establish national requirements (BSP agreements) that are as similar as possible within the common market area in order to ensure a level playing field for BSPs and to facilitate the functioning of the common FCR balancing capacity market. The BSP agreement is regulated by Article 18 of EB GL.

Proposed amendments

After the implementation of the proposal by the TSOs, discrepancies between the approved proposal text and the implemented FCR bid solving algorithm has been identified. The TSOs therefore apply for an amended proposal. The list of amendments is specified below:

a) **Introduce maximum bid size for indivisible bids (Article 6.4);**

b) **Improved wording describing repurchase of FCR balancing capacity (Article 9);**

c) **Introduce time limit for repurchases after second auction has been finalised (Article 9.5);**

d) **Adjustment of description of the overall bid optimisation strategy related to principles for the capacity procurement process (Article 10)**

Motivation for amendments

Here follows an explanation to each amendment as specified in the list a-d above.

a) **Introduce maximum bid size for indivisible bids**
To improve market efficiency, a maximum bid size limit of 25 MW is being introduced for when bids must be divisible. The purpose with the maximum limit is to disincentivise strategic bidding and to reduce the amount of paradoxically rejected bids.

We encourage suppliers of FCR to share their perspectives on the suggested threshold and its potential effects on their operations.

b) **Improved wording describing repurchase of FCR balancing capacity**
Clarification regarding the handling of repurchase after the second auction has been finalised. The new text contains correct definitions as well as formulations.

c) **Introduce time limit for repurchases after second auction has been finalised**
A time limit for when repurchases, after the second auction has been finalised, can no longer be made has been included. The time limit has been included to ensure that the connecting TSO has enough time to replace the repurchased FCR balancing capacity before the relevant delivery period has started. With today's setup repurchases can be made by the BSP until the start of the delivery period. Repurchases can occur so close to the beginning of the next delivery period, that the

ENTSO-E AISBL • Avenue de Cortenbergh 100 • 1000 Brussels • Belgium • Tel + 32 2 741 09 50 • Fax + 32 2 741 09 51 • info@entsoe.eu • www.entsoe.eu

connecting TSO is unable to replace the repurchased capacity, potentially resulting in a shortfall of FCR capacity when entering the next delivery period.

The maximum time limit is set to 60 minutes before the delivery period in the methodology. The applied time limit will be specified in the BSP agreement to provide greater flexibility for adjusting it to meet current needs. The applied time limit will be consulted with the market participants and will never exceed 60 minutes.

d) Adjustment of description of the overall bid optimisation strategy related to principles for the capacity procurement process

With the implementation of pay-as-cleared settlement in the common Danish/Swedish FCR markets in February 2024, the bid optimisation algorithm was altered to incorporate the new settlement principles.

The new bid optimisation algorithm has been designed to minimise the cost of procurement of FCR balancing capacity for all FCR products separately.

To illustrate how the new bid optimisation algorithm optimises, and thereby minimises the overall cost of procurement, a simple example is used.

Example:

Assume a simple setup with three bids and a demand obligation of 10 MW which must be met.

Bid	Price	Volume
#1	5 €/MW	9 MW
#2	10 €/MW	5 MW
#3	15 €/MW	1 MW

In the previous common FCR market (before February 2024), when pay-as-bid settlement was implemented, the bid optimisation algorithm minimised the overall cost of provision. Implementing the minimise overall cost of provision optimisation algorithm in a pay-as-cleared regime would then implicate that the market clearing price would be generated in two steps.

Step 1: Minimise cost of provision, resulting in Bid #1 and Bid #3 being selected.

$$Bid\ \#1 + Bid\ \#3 => 5\frac{€}{MW} * 9\ MW + 15\frac{€}{MW} * 1\ MW = 60\ €$$

Step 2: Set clearing price. The cleared volume is 10 MW and the clearing price (highest accepted bid cost) is 15 €/MW.

In a pay-as-cleared regime, this yields a TSO payout (cost of procurement) of:

$$Cleared\ volume * Clearing\ price => 10\ MW * 15\frac{€}{MW} = 150\ €$$

In the current common FCR market with pay-as-cleared settlement implemented, the bid optimisation algorithm minimises the overall cost of procurement, which results in the clearing price being included in the objective function.

ENTSO-E AISBL • Avenue de Cortenbergh 100 • 1000 Brussels • Belgium • Tel + 32 2 741 09 50 • Fax + 32 2 741 09 51 • info@entsoe.eu • www.entsoe.eu

Step 1: Minimise cost of procurement, resulting in Bid #1 and Bid #2 being selected.

The cleared volume is 14 MW and the clearing price is 10 €/MW.

In the pay-as-cleared regime, this yields a TSO payout (cost of procurement) of:

$$Cleared\ volume * Clearing\ price => 14\ MW * 10 \frac{€}{MW} = 140\ €$$

In the first bid optimisation approach, the bids are selected in order to minimise the total cost of provision, with the selection of bid #1 and bid #3 resulting in the lowest possible cost of provision of 60 €. Consequently, the clearing price for the procurement will be 15 €/MW and the cost of procurement is equal to 150 €. In the second bid optimisation approach, the bids are selected in order to minimise the total cost of procurement, which results in bid #1 and bid #2 being selected. The clearing price is equal to 10 €/MW and the cost of procurement is equal to 140 €.

The first bid optimisation approach is hereafter referred to as the "cost of provision" optimisation approach and the second bid optimisation approach is hereafter referred to as the "cost of procurement" optimisation approach.

With this simple example it is illustrated how optimisation based on minimising the overall cost of provision and cost of procurement differs from each other, and how the pay-as-cleared regime affects the different approaches.

Following below are the key arguments outlining why the cost of procurement optimisation approach is more suited for the pay-as-cleared settlement regime compared to the cost of provision optimisation approach.

- **Correct representation of the marginal price.** The cost of provision optimisation increases the possibility that a small but highly priced bid on the margin will be selected, with the result of a high clearing price.

  The cost of procurement optimisation approach includes the clearing price in the bid selection, which is more consistent with the methodology on the day ahead market, where the clearing of the market takes place in an integrated process, not in steps as with the cost of provision optimisation approach (illustrated in the example).

- **Reduction of paradoxically rejected bids.** The cost of provision optimisation approach will lead to an increase of paradoxically rejected bids (bids which are rejected despite being below the market clearing price) compared to the cost of procurement optimisation approach. This is not desirable, as this leads to a false representation of the marginal value and reduces market efficiency.

- **Reduced incentive for strategical bidding.** With above mentioned arguments, the cost of provision optimisation approach increases the impact of strategical bidding (bids with small volumes but high prices), which is also illustrated in the example above by bid #3. The cost of the procurement optimisation approach reduces the incentive of strategical bidding and instead promotes cost-oriented bidding, with the result of a more logical clearing process (from a market participant perspective) and increased market efficiency.

- **Allignment with Electricity Balancing Guideline:** The cost of procurement optimization approach aligns with EB GL article 58(3)

ENTSO-E AISBL • Avenue de Cortenbergh 100 • 1000 Brussels • Belgium • Tel + 32 2 741 09 50 • Fax + 32 2 741 09 51 • info@entsoe.eu • www.entsoe.eu